



Ares V: Current Status and Future Capabilities

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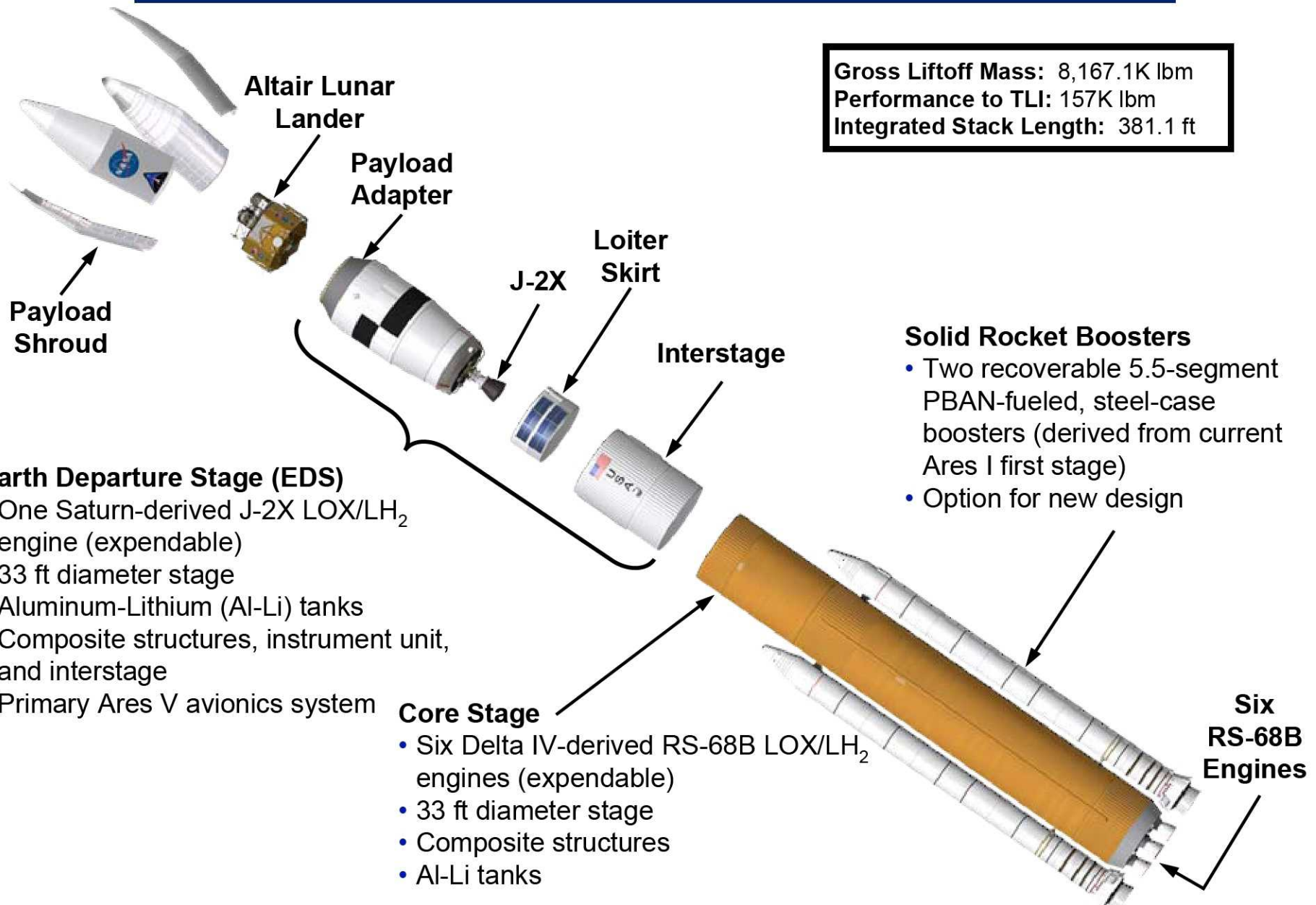


Ares V Elements

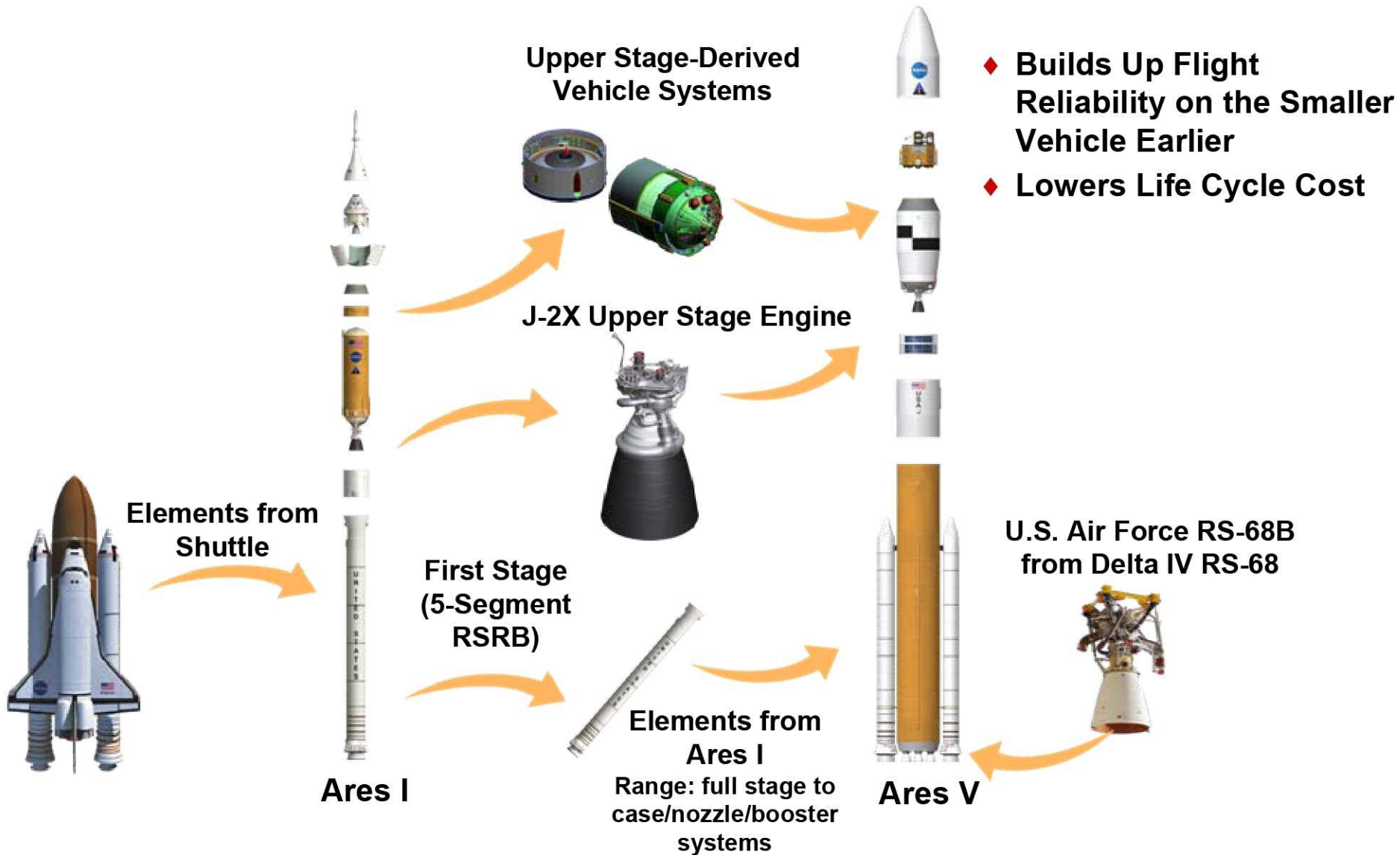
Current Point-of-Departure



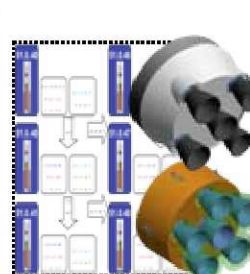
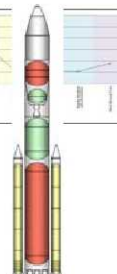
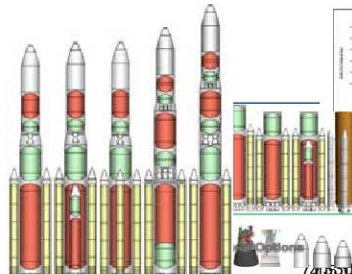
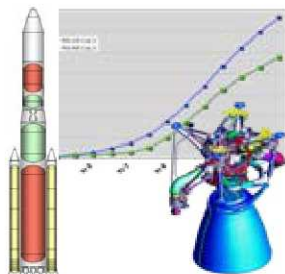
Gross Liftoff Mass: 8,167.1K lbm
Performance to TLI: 157K lbm
Integrated Stack Length: 381.1 ft



Ares I and Ares V Commonality



ESAS (2005) to LCCR (2008) Design Milestones



Original ESAS Capability

- 45.0 mT Lander
- 20.0 mT CEV
- No Loiter in LEO
- 8.4m OML
- 5 SSMEs / 2J2S

CY-06 Budget Trade to Increase

- Ares I / Ares V Commonality
- Ares I : 5 Seg RSRB / J2-X instead of Air-Start SSME
- Ares V: 1 J2-X

Detailed Cost Trade of SSME vs RS-68

- ~\$4.25B Life Cycle Cost Savings for
- 5 Engine Core
- Increased Commonality with Ares I Booster
- 30-95 Day LEO Loiter Assessed

IDAC 3 Trade Space

- Lunar Architecture Team 1/2 (LAT) Studies
- Mission Delta V's increased
- Increase Margins From TLI Only to Earth through TLI
- Loiter Penalties for 30 Day Orbit Quantified

EDS Diameter Change from 8.4m to 10m

- Lunar Architecture Team 1/2 (LAT) Studies
- Lunar /Mars Systems Benefits
- Tank Assembly Tooling Commonality

Incorporate Ares I Design Lessons Learned / Parameters

- Core Engine / SRB Trades to Increase Design Margins
- Increase Subsystem Mass Growth Allowance (MGA)

Recommended Option

- 6 Core Engines
- 5.5 Segment PBAN
- Updated Capability
- 45.0t Lander
- 20.2t CEV
- ~6t Perf. Margin
- 4 Day LEO Loiter
- Ares I Common MGAs
- Booster Decision Summer 2010

220 Concepts Evaluated

320 Concepts Evaluated

730 Concepts Evaluated

460 Concepts Evaluated

2005

2006

2007

2008

Ares I ATP

Orion ATP

Ares I SRR

Orion SRR

Ares I SDR

Ares V MCR



Current Activities

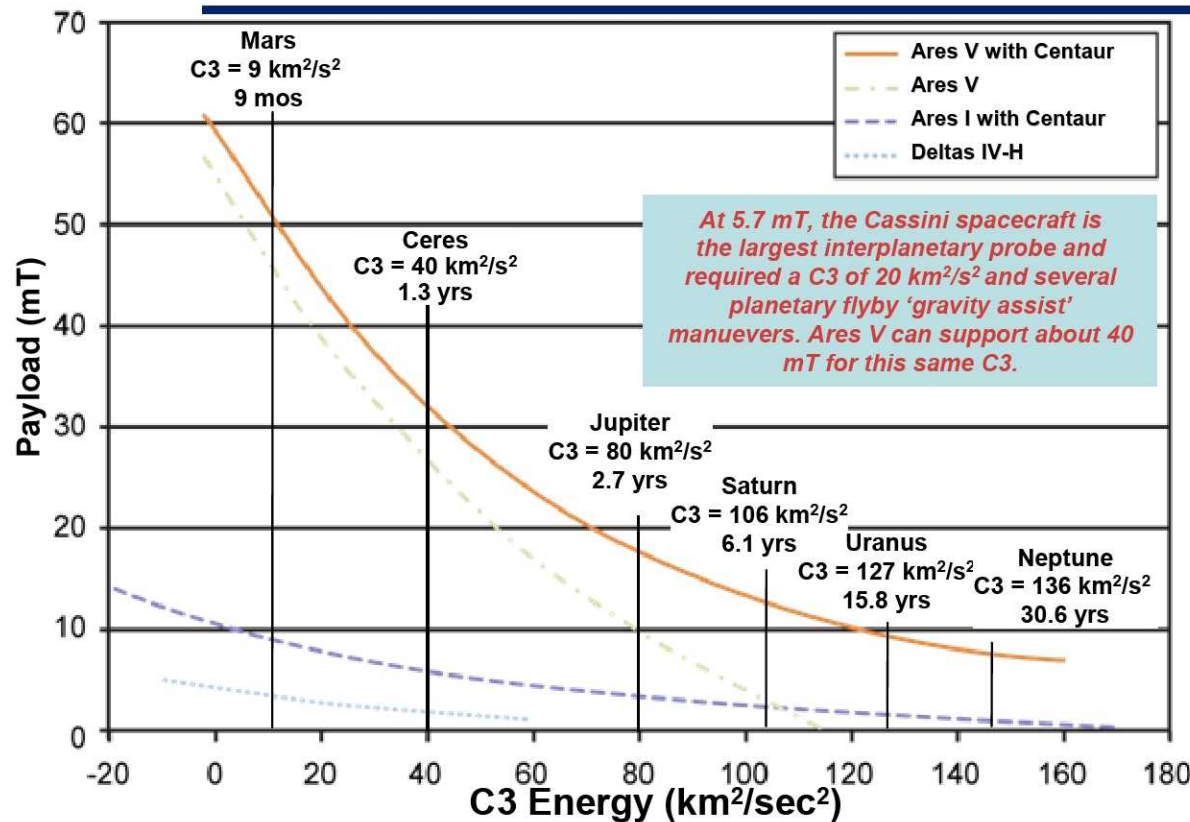


- ◆ Ares V concept definition/requirements development industry proposals
- ◆ Structural test approach
- ◆ Structural test articles
- ◆ Ares V-Y flight test objectives
- ◆ Ares V aerodynamic characterization
- ◆ Manufacturing, test, and launch facilities
- ◆ Core Stage and EDS propulsion test approach and facilities assessment
- ◆ Technology prioritization
- ◆ Ares V Cost threat risk assessment
- ◆ Ares V performance risk assessment





Architecture Flexibility Enables New Science Applications



Large Payload Volume and Lift Capability



Cassini spacecraft
~ to scale
for comparison

Ares V will have the largest payload volume capability of any existing launch system

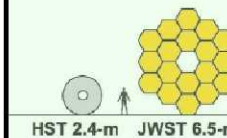
"It is very clear from the outset that the availability of the Ares V changes the paradigm of what can be done in planetary science."

– Workshop on Ares V Solar System Science

"Exciting new science may be enabled by the increased capability of Ares V. The larger launch mass, large volume, and increased C3 capability are only now being recognized by the science community."

– National Academy of Science's "Science Opportunities by NASA's Constellation Program"

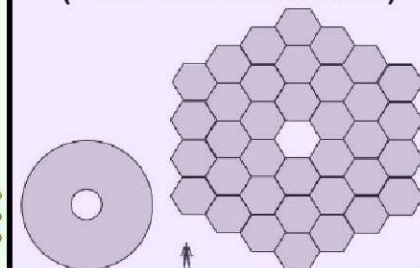
Current Capability



HST 2.4-m JWST 6.5-m

Ares V Enabled Capability

(>10x Collection Area)

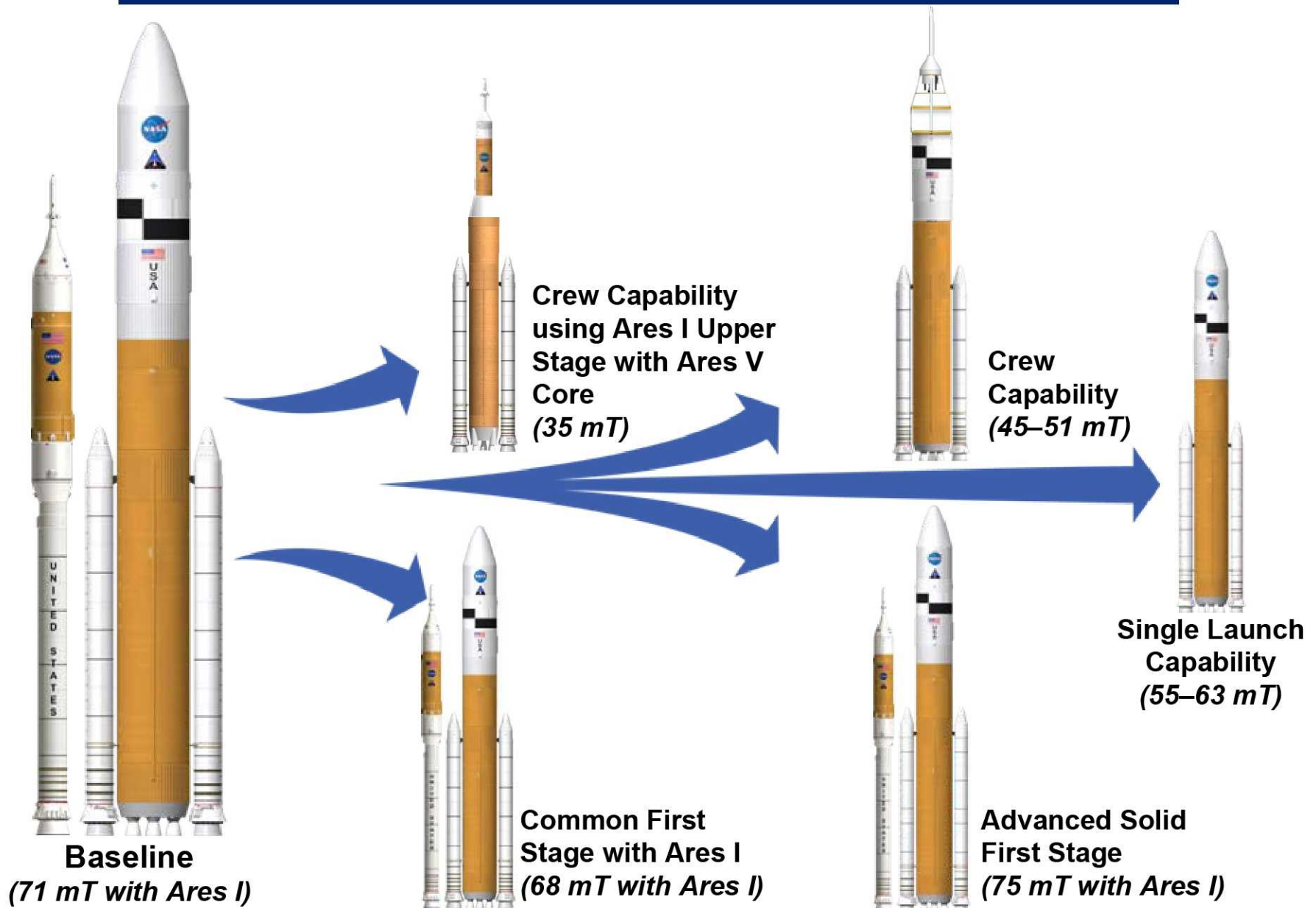


8-9 m 16+ m



Range of Architecture Options Enabled

A Few Examples (Payload to TLI)



Ares V Summary



- ◆ **NASA has begun preliminary concept work on vehicle. Over 1,700 alternatives investigated since ESAS**
- ◆ **Focused on design of EDS, payload shroud, core stage, and RS-68 core stage engines**
- ◆ **Recent point of departure update following the Lunar Capability Concept Review**
 - Adds additional performance margin using an additional RS-68
 - Adds half segment on the first stage boosters
- ◆ **Shroud size dictated by eventual size of Altair lunar lander**
- ◆ **Also investigating alternate uses for Ares V not related to human space exploration**
 - Astronomy applications (e.g., large aperture telescopes)
 - Deep space missions
 - DoD applications
 - Other applications

